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# **Standard 1**

## **CALEA Specification for Traditional Paging**

**Version 1.0**

PCIA Technical Committee  
CALEA Subcommittee  
04 May, 1998

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## Foreword

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In this document, the Personal Communications Industry Association (PCIA) Technical Committee defines the specifications for interface compatibility requirements between paging service providers (PSPs) and law enforcement agencies (LEAs) for Traditional Paging.

Traditional Paging supports the one-way wireless transmission of tone-only, numeric, alphanumeric, and voice messages from a PSP to one or more radio receiving devices within a stipulated, predefined geographic radio coverage area of the PSP's infrastructure. Growing in popularity over the last thirty years, today traditional paging is the service of choice for more than 95% of the more than 40 million subscribers to radio paging services.<sup>1</sup>

The Communications Assistance for Law Enforcement Act (CALEA)<sup>2</sup> was enacted on October 25, 1994. CALEA requires telecommunications carriers to ensure that their equipment, facilities, or services have the capability to:

- (1) "expeditiously ... isolate and enable the government to intercept all communications in the carrier's control to or from the equipment facilities or services of a subscribe[r], concurrently with the communications' transmission, or at any later time acceptable to the government;"
- (2) "expeditiously ... isolate and enable the government to access reasonably available call identifying information about the origin and destination of communications;"
- (3) "make intercepted communications and call identifying information available to government in a format available to the carrier so they may be transmitted over lines or facilities leased or procured by law enforcement to a location away from the carrier's premises;" and
- (4) "meet these requirements with a minimum of interference with the subscriber's services and in such a way that protects the privacy of communications and call identifying information that are not targeted buy [sic] electronic surveillance orders, and that maintains the confidentiality of the government's wiretaps."<sup>3</sup>

Under CALEA, industry associations and standards-setting bodies are authorized to adopt standards for satisfying these assistance capability requirements. Telecommunications carriers, manufacturers, and/or support service providers that comply with these standards have "safe harbor" and are deemed in compliance with CALEA's capability requirements:

"a telecommunications carrier shall be found to be in compliance with the assistance capability requirements under section 103, and a manufacturer of telecommunications transmission or switching equipment or a provider of telecommunications support services shall be found in compliance with section 106, if the carrier, manufacturer, or support service provider is in compliance with publicly available technical requirements or standards adopted by an industry association or standard-setting organization. ..."<sup>4</sup>

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<sup>1</sup> Based on list of top 29 Paging Carriers published by RCR on October 27, 1997.

<sup>2</sup> Communications Assistance for Law Enforcement Act, Pub. L. No 103-414 (CALEA).

<sup>3</sup> Telecommunications Carrier Assistance to the Government, H. Rep. No. 103-827, at 22 (October 4, 1994).

<sup>4</sup> CALEA, § 107.

In November 1997, an Interim Standard (J-STD-025) for wireline and wireless telephony<sup>5</sup> was adopted by the Telecommunications Industry Association Subcommittee TR45.2 and Committee T1 of the Alliance for Telecommunications Industry Solutions. Shortly thereafter, in December 1997, a working group was established under the auspices of PCIA to determine whether J-STD-025 was readily applicable to paging technology and, if not, to develop a separate standard for the paging industry. After carefully reviewing J-STD-025, the working group determined that J-STD-025's telephony specifications were not readily applicable to paging technology and that a separate standard was necessary.

In order to expedite the standards-setting process, the Paging Technical Committee decided to develop a Suite of Standards and release this Suite of Standards in three parts. This part deals with Traditional Paging. Any PSP, manufacturer, or service provider that complies with this Standard will have "safe harbor" under section 107 of CALEA and will be found in compliance with CALEA's assistance capability requirements.

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<sup>5</sup> Lawfully Authorized Electronic Surveillance, TIA/ATIS, Interim/Trial Use Standard (J-STD-025)

## Document Change Record

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v1.0 04 May, 1998

First release of document.



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# **1. Introduction**

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In this document, the PCIATechnical Committee defines the specifications for interface compatibility requirements between PSPs and LEAs for Traditional Paging.

Traditional Paging supports the one-way wireless transmission of tone-only, numeric, alphanumeric, and voice messages from a PSP to one or more radio receiving devices within a stipulated, predefined geographic radio coverage area of the PSP's infrastructure. Growing in popularity over the last thirty years, today traditional paging is the service of choice for more than 95% of the more than 40 million subscribers to radio paging services.<sup>6</sup>

## **1.1 Purpose**

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In this document, the PCIATechnical Committee defines the specifications for interface compatibility requirements between PSPs and LEAs for Traditional Paging.

Any PSP, manufacturer, or service provider that complies with this Standard will have "safe harbor" under section 107 of CALEA and will be found in compliance with CALEA's assistance capability requirements.

## **1.2 Scope**

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The scope of this Standard is to define the services to support LAES and the interface between a PSP and an LEA for Traditional Paging.

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<sup>6</sup> Based on list of top 29 Paging Carriers published by RCR on October 27, 1997.

### 1.3 How This Document is Organized

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This Standard is organized as follows:

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**Foreword** provides an overview of this document.

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**Document Change Record** provides revision control for this document.

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**Section 1 Introduction** defines the purpose, scope, and organization of this document.

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**Section 2 Features and Services Overview** defines the means to access communications through the means of cloned radio receiving devices.

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**Section 3 Assumptions** identifies this Standard's assumptions related to call content and reasonably available call-identifying information.

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**Section 4 Network Reference Model** identifies the set of functional entities and actions for the intercept process.

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**Section 5 Call Content and Reasonably Available Call-Identifying Information Delivery** defines the delivery of call content and reasonably available call-identifying information

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**Section 6 Call Content and Reasonably Available Call-Identifying Information Surveillance Service Description** describes the use of the clone radio receiving device.

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**References** defines a list of the references used in the preparation of this Standard.

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**Glossary** defines the words, acronyms, and initialisms that are used in this Standard.

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## 2. Features and Services Overview

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This Standard defines the means to access communications as an intercept access service through the use of clone radio receiving devices. The services fall into two categories:

- content surveillance services to provide access to an intercept subject's communications, and
- call associated services to provide reasonably available call-identifying information about calls involving the intercept subject(s).

The use of the clone radio receiving device technique satisfies requirements for surveillance of traffic to traditional paging radio receiving devices by furnishing a "duplicate" radio receiving device configured to receive all messages transmitted to the intercept subject's radio receiving device address(es) (commonly called cap-code(s)) identified in the lawful authorization.

Clone radio receiving devices offer a number of distinct advantages which are difficult, if not impossible, to emulate using any alternative technique(s):

- **Availability** Clone radio receiving devices can be provided today, without special engineering,
- **Bandwidth** Virtually no limit exists with regards to the number of simultaneously monitored intercept subjects,
- **Multi-LEA** Virtually no limit exists with regards to the number of LEAs able to simultaneously monitor any specific intercept subject,
- **Mobility** Clone radio receiving devices can be carried to the most desirable location, or to multiple locations, from other law enforcement monitoring locations, within the intercept subject's predefined geographical coverage area,
- **Discretion** Clone radio receiving devices are inherently 'invisible' to both the intercept subject and the PSP's staff, and
- **Effective** Clone radio receiving devices provide surveillance on all calls regardless of the origin (e.g., PSTN, Internet, etc.).

### 3. Assumptions

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Traditional paging LAES capabilities allow a PSP to deliver the intercepted call content (e.g., tone-only, voice, numeric, and alphanumeric paging) and reasonably available call-identifying information to an authorized LEA using the intercept subject's radio transmission channel and geographic coverage area.

*Call Content:* Although not defined in CALEA, "content" is defined in 18 USC 2510 (8) to be "when used with respect to any wire or electronic communications, includes any information concerning the substance, purport, or meaning of that communication." As interpreted by this Standard for traditional paging, call content covers tone-only, numeric, alphanumeric, and voice messages provided over the radio transmission channel to the intercept subject's radio receiving device.

*Call-identifying information:* is defined in CALEA Section 102 (2) to be "dialing or signaling information that identifies the origin, direction, destination, or termination of each communication generated or received by a subscriber by means of any equipment, facility, or service of a [PSP]." As interpreted by this Standard for traditional paging: *destination* is the radio receiving device address to which a call is being made (e.g., called party); *direction* is the outbound transmission path from the PSP to the radio receiving device; *origin* is the number of the party initiating a call (e.g., calling party); and *termination* is the entry to the transmission path from the PSP to the radio receiving device.

For traditional paging, reasonably available call-identifying information is limited to the subject's radio receiving device address that is available through monitoring the radio transmission channel. The call origin is not reasonably available in most PSP installations but may be obtained through the originating service provider (e.g., EC, ISP).

## 4. Network Reference Model

The intercept process consists of a set of functional entities and the actions between the functional entities. The functional entities (PSP Administration, LEA Administration, PSP Infrastructure, and Messaging Input) provide the functions of the system and actions (Authorization, Provision, and Delivery) provide the communication of information between the functional entities. These actions and functional entities are discussed without regard to their implementation. The relationships between these actions and functional entities are shown in Figure 1.

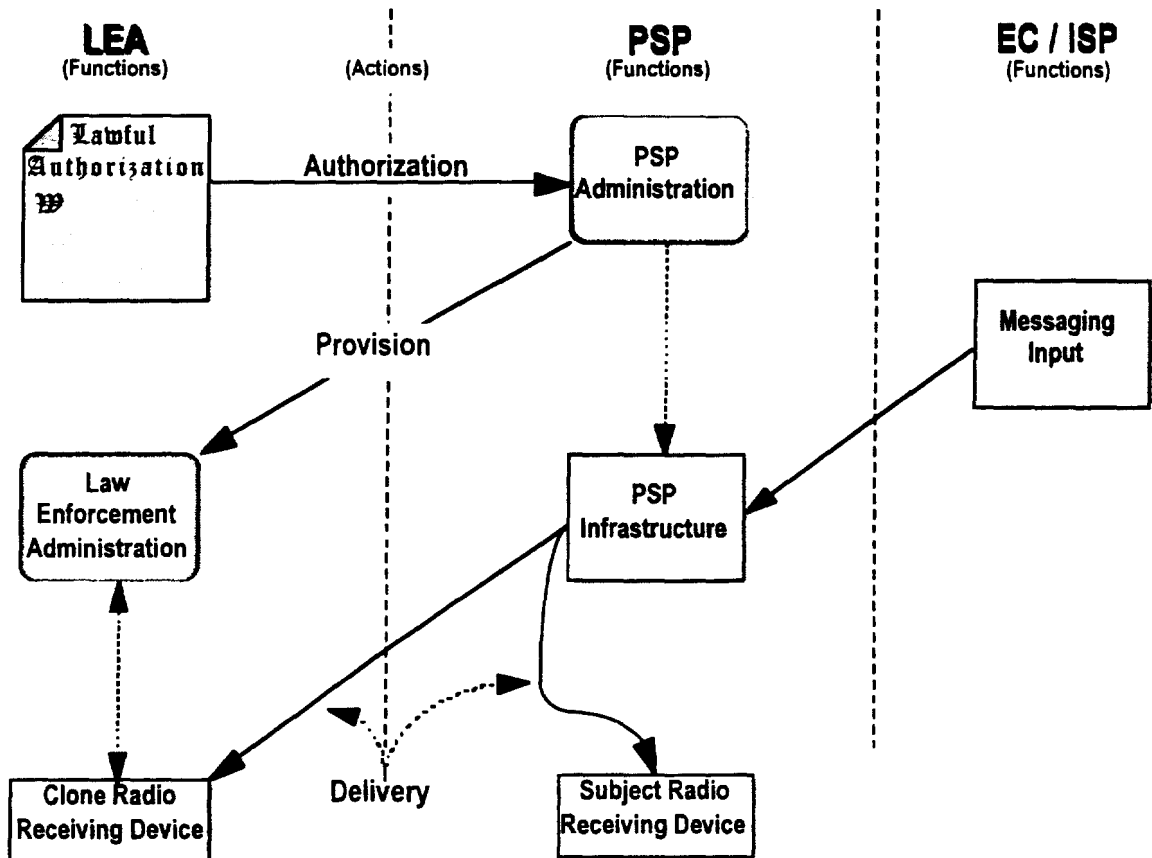


Figure 1: Traditional Paging Intercept Model

The **Lawful Authorization** is an important part of the LAES. No intercepts shall take place without specific lawful authorization. One Lawful Authorization may encompass multiple devices and/or multiple geographic locations.

### 4.1 Lawful Authorization Action

The Lawful Authorization Action is the serving of the Lawful Authorization to the PSP by the LEA.

## **4.2    Paging Service Provider (PSP) Administration Function**

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The Paging Service Provider (PSP) Administration Function is responsible for controlling the Provision and enabling the Delivery Actions.

Other functions of the Paging Service Provider (PSP) Administrative Function are beyond the scope of this standard.

## **4.3    Provision Action**

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The Provision Action is responsible for enabling and disabling activation of a clone radio receiving device(s) as required to receive the reasonably available call-identifying information and call content described in the Lawful Authorization. The Provision Action includes the ability:

- to unobtrusively make the call content and reasonably available call-identifying information available to the delivery action and
- to protect (i.e., prevent unauthorized access, manipulation, and disclosure) intercept controls and intercepted call content and reasonably available call-identifying information consistent with PSP security policies and practices.

For traditional paging, the Provision Action programs the LEA-furnished clone radio receiving device for operation on the radio frequency of operation and with only the capcode(s) of the intercept subject included.

## **4.4    Law Enforcement Administrative Function**

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The Law Enforcement Administrative Function is responsible for controlling LEA electronic surveillance functions.

The LEA is also responsible for providing the clone radio receiving device to the PSP for provisioning and for surrendering the clone radio receiving device for deactivation at termination of the lawful authorization.

The Law Enforcement Administrative Function is the responsibility of the LEA.

Other functions of the Law Enforcement Administrative Function are beyond the scope of this standard.

## **4.5    Messaging Input Function**

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The Messaging Input Function is the delivery of messages from wireline carrier sources (e.g., EC, ISP) to the PSP Infrastructure and is beyond the scope of this Standard.

## **4.6    PSP Infrastructure Function**

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The PSP Infrastructure Function is the switching and radio transmission network of the PSP. For this Standard, the PSP Infrastructure need not be modified to support clone radio receiving devices.

#### **4.7 Delivery Action**

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The Delivery Action is responsible for delivering intercepted communications to one or more clone radio receiving devices. The Delivery Action delivers reasonably available call-identifying information and call content over the radio transmission channel used by the intercept subject. Processing of the delivered reasonably available call-identifying information and call content derived from the clone radio receiving device is the responsibility of the Law Enforcement Administrative Function.

The Delivery Action includes the ability:

- to deliver call content and reasonably available call-identifying information for each intercept subject over the radio transmission channel(s) to clone radio receiving device(s) and
- to protect (i.e., prevent unauthorized access to, manipulation of, or disclosure of) intercept controls and intercepted call content and reasonably available call-identifying information consistent with PSP security policies and practices.

For traditional paging, the Delivery Action transmits call content and reasonably available call-identifying information to both the intercept subject's radio receiving device and the clone radio receiving device.

#### **4.8 Subject Radio Receiving Device Function**

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The Subject Radio Receiving Device Function is responsible for collecting and interpreting communications (i.e., call content and reasonably available call-identifying information) for the intercept subject.

#### **4.9 Clone Radio Receiving Device Function**

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The Clone Radio Receiving Device Function is responsible for collecting lawfully authorized intercepted communications (i.e., call content and reasonably available call-identifying information) for the LEA.

Enabling and disabling of the activation of the clone radio receiving device is the responsibility of the PSP as defined in the Lawful Authorization.

Procurement and monitoring of the clone radio receiving device is the responsibility of the LEA.

At the end of the term of the lawful authorization, the LEA must return the clone radio receiving device to the PSP for deactivation.



## **5. Call Content and Reasonably Available Call-Identifying Information Delivery**

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The PSP is required to provide access to the call content and reasonably available call-identifying information for particular intercept subjects.

A subject's call content and reasonably available call-identifying information is transported to the LEA over the same radio transmission channel used by the intercept subject's radio receiving device and will be present on the clone radio receiving device.

Call-identifying information is provided as part of the radio transmission signaling scheme used to transmit the call content and is available through the use of the clone radio receiving device. Because of this, call content and call-identifying information are inherently synchronized and no additional measures are required to perform the synchronization function.

In cases where circumstances dictate that the call content and the reasonably available call-identifying information associated with a particular subject need to be delivered to more than one LEA simultaneously, as may occur when different LEAs are conducting independent investigations on the same subject, the delivered call content and reasonably available call-identifying information shall be made available to other LEAs as required. This is also true for multiple intercept subjects. Separate clone radio receiving devices will be used to deliver the call content and reasonably available call-identifying information to each LEA.

## **6. Call Content and Reasonably Available Call-Identifying Information Surveillance Service Description**

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The clone radio receiving device is used to monitor all paging communications to the intercept subject(s) and to display the exact content(s) of these messages concurrent with their receipt by the subject.

Clone radio receiving devices provide the additional flexibility to permit an LEA to intercept the subject's communications anywhere within the intercept subject's pre-defined geographical coverage area.

The clone radio receiving device provides access to the transmissions to the intercept subject unobtrusively. Access to reasonably available call-identifying information and call content does not deny the availability of traditional paging service to either the intercept subject or the calling party.

The PSP shall not be responsible for decrypting, or ensuring the government's ability to decrypt, any communications encrypted by a subscriber or customer, unless the encryption was provided by the PSP and the PSP possesses the information necessary to program the clone radio receiving device to decrypt the communication.

## References

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Communications Assistance for Law Enforcement Act, Pub. L. No. 103-414

Telecommunications Carrier Assistance to the Government, H. Rep. No. 103-827

Lawfully Authorized Electronic Surveillance, TIA/ATIS, Interim/Trial Use Standard (J-STD-025)



## Glossary

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**CALEA**

Communications Assistance for Law Enforcement Act.

**call content**

see *content*.

**call-identifying information**

is defined in CALEA Section 102 (2) to be "dialing or signaling information that identifies the origin, direction, destination, or termination of each communication generated or received by a subscriber by means of any equipment, facility, or service of a [PSP]." As interpreted by this Standard for traditional paging: *destination* is the radio receiving device address to which a call is being made (e.g., called party); *direction* is the outbound transmission path from the PSP to the radio receiving device; *origin* is the number of the party initiating a call (e.g., calling party); and *termination* is the entry to the transmission path from the PSP to the radio receiving device. For traditional paging, reasonably available call-identifying information is limited to the subject's radio receiving device address that is available through monitoring the radio transmission channel. The call origin is not reasonably available in most PSP installations but may be obtained through the originating service provider (e.g., EC, ISP).

**calling party**

the originating party of a traditional paging message destined for a subscriber.

**capcode**

the radio address decoder element in each radio receiving device that permits the radio receiving device to be selectively identified and signaled over a common radio channel. Colloquially, this term is used to identify the radio receiving device's radio signaling scheme address.

**channel**

an independent path for communicating between two points.

**clone radio receiving device**

a radio receiving device, provided by the LEA, that is pre-programmed by the PSP as authorized by a lawful authorization with the intercept subject's radio receiving address and set to monitor the subject's radio receiving frequency with the express purpose of decoding and capturing the subject's call content when used within the subject's fixed geographical broadcast area. A clone radio receiving device has the same characteristics and call content reception and processing features as the intercept subject's radio receiving device.

**Clone Radio Receiving Device Function**

is responsible for collecting lawfully authorized intercepted communications (i.e., call content and reasonably available call-identifying information) for the LEA. see *clone radio receiving device*.

**Commission**

defined in CALEA Section 102 (3) to be "the Federal Communications Commission".

**communication**

in this Standard, communication refers to any wire or electronic communication, as defined in 18 USC 2510.

**communication intercept**

see *intercept*.

**complete**

a traditional paging call is considered complete when it has been transmitted by the PSP's radio transmission network.

**connection**

a relationship between two or more parties of a call to allow communication between them.

**content**

is defined in 18 USC 2510 (8) to be "when used with respect to any wire or electronic communications, includes any information concerning the substance, purport, or meaning of that communication." As interpreted by this Standard for traditional paging, call content covers tone-only, numeric, alphanumeric, and voice messages provided over the radio transmission channel to the intercept subject's radio receiving device.

**Delivery Action**

is responsible for delivering intercepted communications to one or more clone radio receiving devices. The Delivery Action delivers reasonably available call-identifying information and call content over the radio transmission channel used by the intercept subject. For traditional paging, the Delivery Action transmits call content and reasonably available call-identifying information to the intercept subject's radio receiving device and the clone radio receiving device.

**destination**

see *call-identifying information*

**direction**

see *call-identifying information*

**EC**

see *Exchange Carrier*.

**electronic surveillance**

the statutory-based legal authorization, process, and associated technical capabilities and activities of LEAs related to the interception of wire, oral, or electronic communications while in transmission. As used in this Standard for traditional paging, *surveillance* includes the radio channel call-identifying information and call content available through the use of a clone radio receiving device for lawfully authorized communication intercept. It does not include any other form of surveillance.

**Exchange Carrier**

the wireline PSTN carrier interface provider. Exchange carriers may take the form of a local exchange carrier or an interexchange carrier.

**functional entity**

a system or subsystem capable of providing a defined service.

**government**

defined in CALEA Section 102 (5) to be "the government of the United States and any agency or instrumentality thereof, the District of Columbia, any commonwealth, territory, or possession of the United States, and any State or political subdivision thereof authorized by law to conduct electronic surveillance."

**Information Service**

defined in CALEA Section 102 (6) to be "(A) the offering of a capability for generating, acquiring, storing, transforming, processing, retrieving, utilizing, or making available information via telecommunication; and (B) includes -- (i) a service that permits a customer to retrieve stored information from, or file information for storage in, information storage facilities; (ii) electronic publishing; and (iii) electronic messaging services; but (C) does not include any capability for a [PSP's] internal management, control, or operation of its telecommunication network."

**Intercept**

defined in 18 USC 2510 (4) to be "the aural or other acquisition of the content of any wire, electronic, or oral communication through the use of any electronic, mechanical, or other device." In this Standard, traditional paging intercepts will be accomplished through the use of clone radio receiving devices.

**Intercept Subject**

a paging service subscriber whose reasonably available call-identifying information and call content have been authorized by a court to be intercepted and delivered to an LEA. In this Standard, a traditional paging intercept subject's delivered information will be that available through the use of a clone radio receiving device.

**Internet Service Provider**

the wireline Internet carrier interface provider.

**ISP**

see *Internet Service Provider*.

**LAES**

Lawfully Authorized Electronic Surveillance

**Law Enforcement Administrative Function**

is responsible for controlling LEA electronic surveillance functions for traditional paging, and for providing the clone radio receiving device to the PSP for provisioning and for surrendering the clone radio receiving device for deactivation at termination of the lawful authorization. The Law Enforcement Administrative Function is the responsibility of the LEA. Other functions of the Law Enforcement Administrative Function are beyond the scope of this standard.

**Law Enforcement Agency**

a government entity with the legal authority to conduct electronic surveillance.

**Lawful Authorization**

no intercepts shall take place without specific lawful authorization. One Lawful Authorization may encompass multiple devices and/or multiple geographic locations.

**Lawful Authorization Action**

the serving of the Lawful Authorization to the PSP by the LEA.

**LEA**

see *Law Enforcement Agency*.

**Messaging Input Function**

is the delivery of messages from wireline carrier sources (e.g., EC, ISP) to the PSP Infrastructure.

**Origin**

see *call-identifying information*.

**paging service provider<sup>7</sup>**

defined from CALEA Section 102 (8) to be, "a person or entity engaged in the transmission or switching of wire or electronic communications as a common carrier for hire, and includes 1) a person or entity engaged in providing commercial mobile service, or 2) a person or entity engaged in providing wire or electronic communications switching or transmission service to the extent that the Commission finds such service is a replacement for a substantial portion of local telephone exchange service and that it is in the public interest to deem such a person or entity to be a [PSP] for purposes of this title. This does not include 1) persons or entities insofar as they are engaged in providing information services, and 2) any class or category of [PSPs] that the Commission exempts by rule after consultation with the U. S. Attorney General."

**Paging Service Provider Administration Function**

is responsible for controlling the Provision and enabling the Delivery Actions. Other functions of the Paging Service Provider (PSP) Administrative Function are beyond the scope of this standard.

**Provision Action**

is responsible for enabling and disabling activation of a clone radio receiving device(s) as required to receive the reasonably available call-identifying information and call content described in the Lawful Authorization. For traditional paging, the Provision Action furnishes the clone radio receiving device programmed for the radio frequency of operation with only the cap-code(s) of the intercept subject included.

**PSDN**

Public Switched Data Network.

**PSP**

*see Paging service provider.*

**PSP Administration Function**

*see Paging Service Provider Administration Function.*

**PSP infrastructure**

embodies the central control switch(es), base station transmitter(s), and wire-line interconnect(s) that tie the radio network to the PSTN, PSDN, the World Wide Web, and other land-based facilities to allow paging calls to be initiated and transmitted to the intended subscriber.

**PSP Infrastructure Function**

*see PSP Infrastructure.*

**PSTN**

Public Switched Telephone Network.

**RF**

Radio Frequency

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<sup>7</sup> This Standard uses the term *paging service provider* instead of the CALEA term *telecommunication carrier*.

**signaling scheme**

the radio signaling protocol used to deliver messages to specific radio receiving devices. Radio signals radiated by base station transmitters are encoded with radio receiving device capcode and message content information. These signaling schemes may utilize analog (e.g., 2-tone, 5/6-tone) or digital (e.g., POCSAG, Golay Sequential Code®, FLEX™, ERMES) modulating techniques with the transmitted information organized in accordance with any of several formats which specify such parameters as transmission rate, structure of the information, and error control mechanisms.

**Subject Radio Receiving Device Function**

is responsible for collecting and interpreting communications (i.e., call content and reasonably available call-identifying information) for the intercept subject.

**subscriber**

entity subscribing to the services provided by the paging service provider.

**traditional paging**

traditional paging supports the one-way wireless transmission of tone-only, numeric, alphanumeric, and voice messages from a PSP to one or more radio receiving devices within a stipulated, predefined geographic radio coverage area of the PSP's infrastructure.

**termination**

see *Call-Identifying Information*.

**transmission**

the act of transferring communications from one location or another by wire, radio, electromagnetic, photoelectronic, or photo-optical system.

**transparent**

end-to-end transmission without insertion or loss of information.

**unobtrusive**

not undesirably noticeable or blatant; inconspicuous; within normal call variances.

**USC**

United States Code.

**wire communications**

defined in 18, USC 2510 (1) to be "any aural transfer made in whole or in part through the use of facilities for the transmission of communications by the aid of wire, cable, or other like connection between the point of origin and the point of reception (including the use of such connection in a switching station) furnished or operated by any person engaged in providing or operating such facilities for the transmission of interstate or foreign communications or communications affecting interstate or foreign commerce and such term includes any electronic storage of such communication."

**wireless**

in this Standard refers to traditional paging service.

**wireline**

in this Standard refers to traditional wire-based telephone and packet data services.



